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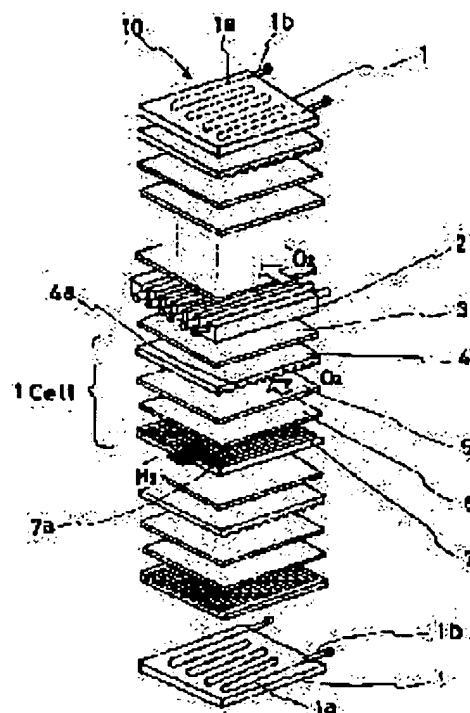
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(54) FUEL CELL

(57)Abstract:

PURPOSE: To ensure protection after stop of operation and improve the life of an electrode and cell and shorten the rise-up time at the time of restart.

CONSTITUTION: In a fuel cell where hydrogen is led to a fuel-pole-side electrode 6 and oxygen is led to an air-pole-side electrode 5 to generate electricity, the upper and lower portions of the fuel cell are held between insulating plates 1 where PTC heaters 1a having PTC characteristics are respectively arranged.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] Especially this invention relates to a pyrogenetic-reaction mold fuel cell about a fuel cell.

[0002]

[Description of the Prior Art] When it is the high temperature form type of the reaction temperature of a fuel cell, in 180-210 degrees C and a melting carbonate electrolyte mold, in a solid-state organic mold electrolyte (SPE) mold, 630-670 degrees C and an elevated-temperature solid oxide type also become [the reaction temperature / 130-150 degrees C and a phosphoric-acid mold electrolyte mold] -1000 degree C. After having returned to ordinary temperature, before reaching elevated-temperature time amount from this reaction temperature, time amount will be taken, and incubation is the need because of protection of after 1 shutdown and an electrode.

[0003] 2) In order to shorten the build up time at the time of a reboot, the good heater of a response is the need.

[0004] 3) At the time of incubation, in order for the need etc. to ask for and put in practical use a temperature control to which the temperature of a cell proper does not rise too much, the technical problem which simplifies the above-mentioned item occurred.

[0005] According to this, it is the type made to circulate through the electrolytic solution as shown in JP,57-55070,A as a conventional technique, and is forming a heater in a part of circulation path, and the fuel cell with a good movement property is proposed.

[0006]

[Problem(s) to be Solved by the Invention] However, since it circulated through a strong base to the electrolytic solution, the Prior art had the trouble of corrosion fatigue (life) of the whole equipment.

[0007] Moreover, the steam in air(water) and carbon dioxide gas were inhaled, concentration fell to the electrolytic solution, and it became the cause of an output down.

[0008] This invention makes it the technical problem to solve the above-mentioned trouble, can perform protection after shutdown certainly, can expect the improvement in a life of an electrode-cell, and offers shortening of the build up time at the time of a reboot.

[0009]

[Means for Solving the Problem] The technical means for attaining the above-mentioned purpose are in the fuel cell characterized by pinching the upper and lower sides of said fuel cell with the electric insulating plate by which the PTC heater which has a PTC property has been arranged in the fuel cell which hydrogen is introduced [fuel cell] into a fuel electrode lateral electrode, an air pole lateral electrode, and a fuel electrode lateral electrode, and oxygen is introduced [fuel cell] into an air pole lateral electrode, and generates the electrical and electric equipment.

[0010]

[Example] Hereafter, one example of this invention is explained by referring to drawing 1 - drawing 3 .

[0011] Drawing 1 is the decomposition perspective view of the former to a certain phosphoric acid fuel cell 10. It consists of the fluting air pole side separator 4 which becomes order from an electric insulating plate 1, the cooling plate 2 which consists of a carbon plate, a carbon sheet 3, and a carbon plate, an air pole lateral electrode 5 which consists of carbon-platinum, a fuel electrode lateral electrode 6 which consists of carbon-platinum, and a fluting fuel electrode side separator 7 which consists of a carbon plate from 1 cell.

[0012] The air which contains oxygen in two or more air induction 4a arranged by the fluting air pole side separator 4 is introduced. On the other hand, hydrogen is introduced into two or more air induction 7a of the fluting fuel electrode lateral electrode 7 arranged in said fluting air pole side separator 4 and the direction of a right angle by the fluting fuel electrode side separator 7. By such configuration, oxygen ion is generated in the air lateral electrode 5, and a hydrogen ion is generated in the fuel lateral electrode 6. The hydrogen ion of the fuel electrode lateral electrode 6 can draw near to the oxygen ion of the air pole lateral electrode 5 between the air pole lateral electrode 5 and the fuel electrode lateral electrode 6, and the generation reaction of hydrogen and oxygen arises. When Electron e moves lead wire to coincidence, a current

occurs.

[0013] In addition, in other details, about explanation, since it is the same, it abbreviates to a common phosphoric acid fuel cell here.

[0014] The electric insulating plate 1 with which the above-mentioned body 10 of a fuel cell was arranged up and down consists of alumina ceramics, and an electric insulating plate 1 binds the body of a fuel cell tight with a bolt etc.

[0015] It has heater ability on one side of this electric insulating plate 1, and loop-formation-like PTC heater 1a which gave self-temperature control is made to arrange in it. As for the both ends of this PTC heater 1a, terminal 1b is prepared. When this PTC (Positive Temperature Coefficient) heater 1a reaches a certain temperature (curie point), it is a sensible-heat resistance element with the forward temperature characteristic which shows increase of resistance. Therefore, a current will increase and PTC which the electrical potential difference was applied [PTC] and carried out self-generation of heat will be stabilized at almost fixed temperature, if temperature falls. That is, PTC plays the role of both a heating element and a thermoregulator.

[0016] That is, if PTC heater 1a becomes a certain laying temperature, it will cut off the electrical and electric equipment from terminal 1b, and when the temperature of a body falls, the electrical and electric equipment flows again and it has the function and autogenous regulation function of a heater.

[0017] This PTC heater 1a is arranged by screen-stencil, and has become the configuration bent two or more boxes to 1mm in thickness, and about [width-of-face 5mm] loop shape.

[0018] In addition, in this invention, although the PTC heater is arranged on an electric insulating plate 1, you may also embed a PCT heater at an electric insulating plate.

[0019]

[Effect of the Invention] This invention has the following effectiveness as above.

[0020] In the fuel cell of a high temperature form, protection after 1 shutdown can be performed certainly and the improvement in a life of an electrode-cell is possible.

[0021] 2) Shortening of the build up time at the time of a reboot is possible.

[0022] 3) By applying PTC, it is the temperature-control system (it limits at the time of incubation.) of a cell proper.

[0023] The simplification of correspondence is attained in heating and a cooling system during actuation.

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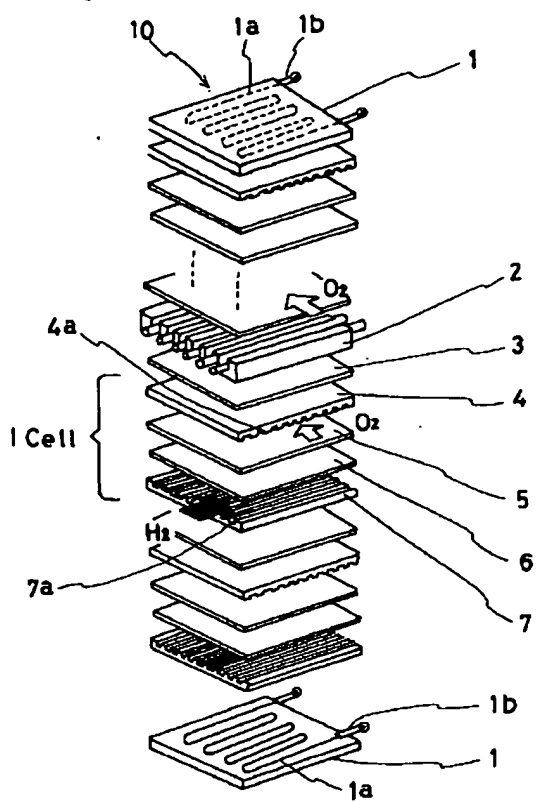
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CLAIMS

[Claim(s)]
[Claim 1] The fuel cell characterized by pinching the upper and lower sides of said fuel cell in the fuel cell which hydrogen is introduced [fuel cell] into a fuel electrode lateral electrode, an air pole lateral electrode, and a fuel electrode lateral electrode, and oxygen is introduced [fuel cell] into an air pole lateral electrode, and generates the electrical and electric equipment with the electric insulating plate by which the PTC heater which has a PTC property has been arranged.

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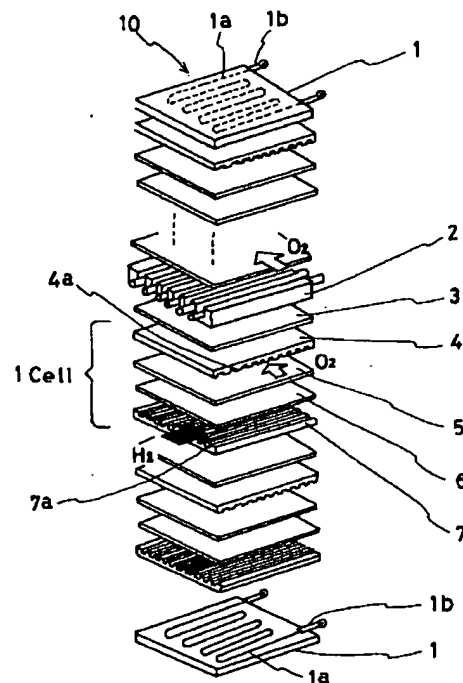
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(54)【発明の名称】 燃料電池

(57)【要約】

【目的】 運転停止後の保護が確実にでき、電極一電池の寿命向上を期待でき、再起動時の立ち上がり時間の短縮化を提供するもの。

【構成】 燃料極側電極6と、空気極側電極5と、燃料極側電極6に水素を導入し、空気極側電極5には酸素を導入して電気を発生させる燃料電池において、前記燃料電池の上下を、PTC特性を有するPTCヒータ1aが配置された絶縁板1により、挟持したことを特徴とする燃料電池。



【特許請求の範囲】

【請求項1】 燃料極側電極と、空気極側電極と、燃料極側電極に水素を導入し、空気極側電極には酸素を導入して電気を発生させる燃料電池において、前記燃料電池の上下を、PTC特性を有するPTCヒータが配置された絶縁板により、挟持したことを特徴とする燃料電池。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、燃料電池に関し、特に高温反応型燃料電池に関する。

【0002】

【従来の技術】燃料電池の反応温度の高温型タイプの場合、固体有機型電解質(SPE)型では、その反応温度は、130～150℃、リン酸型電解質型は、180～210℃、熔融炭酸塩電解質型は、630～670℃、高温固体電解質型は、～1000℃にもなる。この反応温度より、常温に戻ってしまった後、高温時間に達するまでに、時間がかかり、

1) 運転停止後、電極の保護のために保温が必要。

【0003】2) 再起動時の立ち上がり時間を短縮するため、レスポンスの良好なヒータが必要。

【0004】3) 保温時、電池本体の温度が上昇しすぎないように温度コントロールを必要等が求められ、実用化するためには上記の項目を簡素化する課題があった。

【0005】これに応じて、従来技術としては、特開昭57-55070号公報に示されるような電解液を循環させるタイプで、循環経路の一部にヒータを設けることで、機動特性の良好な燃料電池が提案されている。

【0006】

【発明が解決しようとする課題】しかしながら、従来の技術は、電解液に強アルカリを循環するために、装置全体の腐蝕疲労(寿命)の問題点があった。

【0007】また空気中の水蒸気(水)、炭酸ガスを吸って電解液に濃度が低下し、出力ダウンの原因となった。

【0008】本発明は、上記問題点を解決することをその課題とし、運転停止後の保護が確実にでき、電極-電池の寿命向上を期待でき、再起動時の立ち上がり時間の短縮化を提供するものである。

【0009】

【課題を解決するための手段】上記目的を達成するための技術的手段は、燃料極側電極と、空気極側電極と、燃料極側電極に水素を導入し、空気極側電極には酸素を導入して電気を発生させる燃料電池において、前記燃料電池の上下を、PTC特性を有するPTCヒータが配置された絶縁板により、挟持したことを特徴とする燃料電池にある。

【0010】

【実施例】以下、本発明の一実施例について図1～図3

を参考にして説明する。

【0011】図1は、従来からあるリン酸型燃料電池10の分解斜視図である。1cellの上から順に絶縁板1、カーボン板からなる冷却板2、カーボンシート3、カーボン板からなる溝付空気極側セパレータ4、カーボン-白金よりなる空気極側電極5、カーボン-白金よりなる燃料極側電極6、カーボン板からなる溝付燃料極側セパレータ7から構成されている。

【0012】溝付空気極側セパレータ4に配設される複数の空気導入部4aに、酸素を含む空気を導入する。一方、溝付燃料極側セパレータ7には、前記溝付空気極側セパレータ4と直角方向に配設される溝付燃料極側電極7の複数の空気導入部7aには水素が導入される。このような構成により、酸素イオンが空気側電極5に発生し、水素イオンが燃料側電極6に発生する。空気極側電極5と燃料極側電極6との間に燃料極側電極6の水素イオンが空気極側電極5の酸素イオンに引き寄せられ、水素と酸素の生成反応が生じる。同時に電子eが、導線を動くことにより、電流が発生するものである。

【0013】なお、他の詳細に説明については、一般のリン酸型燃料電池と同じであるので、ここでは省略する。

【0014】上記の燃料電池本体10の上下に配設された絶縁板1は、アルミナセラミックスからなり、絶縁板1は燃料電池本体をボルト等により、締めつける。

【0015】この絶縁板1の片面に、ヒータ機能を有し、自己温度制御を持たせたループ状のPTCヒータ1aを配設させる。このPTCヒータ1aの両端は端子1bが設けられている。このPTC(Positive Temperature Coefficient)ヒータ1aは、ある温度(キュリー点)に達すると抵抗値の増大を示す正温度特性をもった感熱抵抗素子である。従って、電圧を加えて自己発熱させたPTCは、温度が下がると電流が増加しほぼ一定の温度で安定する。すなわち、PTCは発熱体と温度調節器の両方の役割を果たすものである。

【0016】つまり、PTCヒータ1aはある設定温度になると、端子1bからの電気をカットオフし、本体の温度が下がると再び電気が流れ、ヒータの機能と自己制御機能を合わせ持つものである。

【0017】このPTCヒータ1aは、スクリーン印刷により配設され、厚さ1mm、幅5mm程度のループ形状に複数折り曲げた形状になっている。

【0018】なお本発明では、PTCヒータを絶縁板1上に配置しているが、絶縁板にPTCヒータを埋め込んでもよい。

【0019】

【発明の効果】以上のとおり、本発明は、以下のような効果を有する。

【0020】高温型の燃料電池において、

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1) 運転停止後の保護が確実にでき、電極-電池の寿命向上が可能。

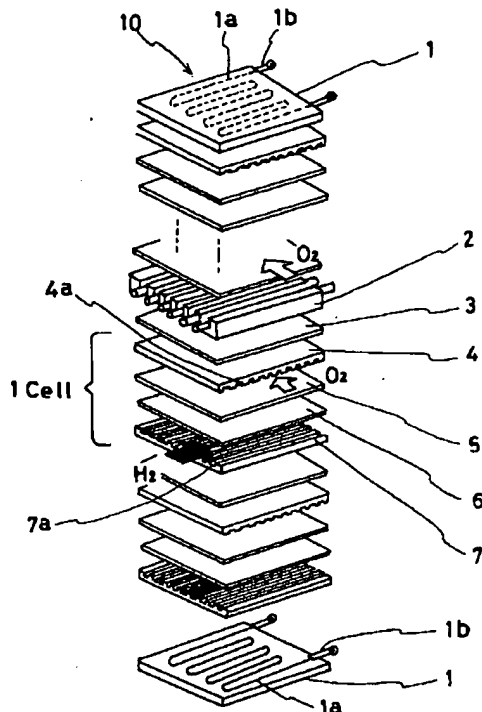
【0021】2) 再起動時の立ち上がり時間の短縮化が可能。

【0022】3) PTCを適用することで、電池本体の温度コントロール系(保温時に限定)。

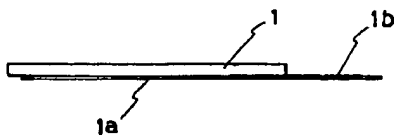
【0023】作動中は加熱・冷却系にて対応)の簡素化が可能となる。

【図面の簡単な説明】

【図1】



【図3】



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【図1】本発明の燃料電池の分解斜視図。

【図2】PTCヒータが配置された絶縁板の平面図。

【図3】PTCヒータが配置された絶縁板の側面図。

【符号の説明】

- 1 a 絶縁板、
- 1 b PTCヒータ、
- 5 空気極側電極、
- 6 燃料極側電極、
- 10 燃料電池。

【図2】

